

REMARKS/ARGUMENTS

Favorable reconsideration of this application, as presently amended and in light of the following discussion, is respectfully requested.

Claims 1-3, 5-7, 9-11, and 13-15 are pending, Claims 1, 5, 9, and 13-15 having been amended. The changes and additions to the claims do not add new matter and are supported by the originally filed specification, for example, on page 25, line 37 to page 26, line 19; and Figs. 11 and 13.

In the outstanding Office Action, Claims 1-3, 5, 7, 9, 11, and 13-15 were rejected under 35 U.S.C. §103(a) as being unpatentable over Suzuki et al. (“Arrayed Air Jet Based Haptic Display: Implementing An Untethered Interface”, NTT Cyber Space Laboratories, NTT Corporation; hereinafter “Suzuki”) in view of DeBerg (U.S. Patent No. 4,191,507),; and Claims 6 and 10 were rejected under 35 U.S.C. § 103(a) as unpatentable over Suzuki in view of DeBerg and Iwaki et al. (JP Pub. No. 2004-157677, hereinafter “Iwaki”).

With respect to the rejection of Claim 1 under 35 U.S.C. §103(a), Applicants respectfully submit that the present amendment to Claim 1 overcomes this ground of rejection. Amended Claim 1 recites, *inter alia*,

placing a receiver at a predetermined height above a plurality of nozzles arranged on a plane, the receiver including a concave center unit that declines radially outward from an axis of symmetry of the receiver to an outer border of the concave center unit, such that a shape of the concave center unit is a hemisphere, and an inclined side surface unit that inclines radially outward from the outer border of the concave center unit with respect to the axis of symmetry,

selecting a nozzle for which $|V_{PN}|$ is the smallest from among candidate nozzles on the plane that satisfy $R1 \leq |V_{PN}| \leq R2$ and $0 \leq |\theta_{ij}| \leq \gamma$, wherein $|V_{PN}|$ indicates a distance between a candidate nozzle and the axis of symmetry of the receiver, $R1$ indicates a distance between the axis of symmetry of the receiver and an inner border of the inclined side surface unit, $R2$ indicates a distance

between the axis of symmetry of the receiver and an outer border of the inclined side surface unit, $|\theta_{ij}|$ indicates an absolute value of an angle between a first direction from the candidate nozzle to the axis of symmetry of the receiver and a second direction of a force to be provided to the receiver, and γ indicates a predetermined value for the angle, and

jetting a gas or a liquid from the selected nozzle upon the inclined side surface unit of the receiver to convey a force in a direction perpendicular to a direction of the jetting gas or liquid toward the axis of symmetry of the receiver.

In a non-limiting example of the invention defined by Claim 1, a force having a desired direction (toward the center of the concave center unit in the plane perpendicular to the direction of the jetting gas or liquid) can be obtained by selecting an appropriate nozzle for jetting. Thus, the control system can be simplified. Further, as described on page 16, lines 6-10, with reference to Fig. 5C, the jetted air (or liquid) flows out mainly laterally to outside the side surface. Thus, the force perpendicular to the jetting direction can be made relatively large compared to the force parallel to the jetting direction.

Also, by selecting a nozzle for which $|V_{PN}|$ is the smallest (near to the center of the receiver) as claimed, the direction of the flow of jetted gas or liquid can be changed more smoothly along the inclined side surface compared to the case where $|V_{PN}|$ is larger (farther away from the center of the receiver) (see Fig. 6).

Turning to the applied art, Suzuki is directed to an arrayed air jet based haptic display which employs an array of air jets in a two-dimensional matrix as shown in Fig. 1 of Suzuki. The Office Action had relied on page 2, col. 1, lines 3-17 and 38-48; and Figs. 1-2 of Suzuki to disclose “selecting a nozzle from among a plurality of candidate nozzles arranged on the plane, the selected nozzle having a smallest distance between the selected nozzle and the axis of symmetry of the receiver,” as previously recited in Claim 1. Suzuki describes that a user holds an air receiver at the end of a stick and the system detects a position and direction of

the air receiver via a magnetic sensor. If the receiver is determined to contact an object (a virtual object), the system releases air from an appropriate nozzle, and if the receiver is moved across the object's surface, the system activates a next nozzle so that the user feels as if he/she is touching a virtual object's surface (see page 2, col. 1, lines 3-17). Suzuki also describes that two air receivers held by the user may also be tracked (see page 2, col. 1, lines 38-48).

However, Suzuki does not provide any details on how an "appropriate" nozzle is selected. Thus, Suzuki clearly fails to disclose or suggest "selecting a nozzle for which $|V_{PN}|$ is the smallest from among candidate nozzles on the plane that satisfy $R1 \leq |V_{PN}| \leq R2$ and $0 \leq |\theta_{ij}| \leq \gamma$, wherein $|V_{PN}|$ indicates a distance between a candidate nozzle and the axis of symmetry of the receiver, $R1$ indicates a distance between the axis of symmetry of the receiver and an inner border of the inclined side surface unit, $R2$ indicates a distance between the axis of symmetry of the receiver and an outer border of the inclined side surface unit, $|\theta_{ij}|$ indicates an absolute value of an angle between a first direction from the candidate nozzle to the axis of symmetry of the receiver and a second direction of a force to be provided to the receiver, and γ indicates a predetermined value for the angle," as defined by amended Claim 1.

Deberg and Iwaki have been considered but fail to remedy the deficiencies of Suzuki with regard to amended Claim 1.

Therefore, Applicants respectfully submit that amended Claim 1 (and all associated dependent claims) patentably distinguishes over Suzuki, Deberg and Iwaki, either alone or in proper combination.

Amended independent Claims 5, 9, and 13-15 recite features analogous to those of amended Claim 1 discussed above. Therefore, Applicants respectfully submit that amended

Claims 5, 9, and 13-15 (and all associated dependent claims) patentably distinguish over Suzuki, Deberg and Iwaki, either alone or in proper combination.

Consequently, in light of the above discussion and in view of the present amendment, the outstanding grounds for rejection are believed to have been overcome. The present application is believed to be in condition for formal allowance. An early and favorable action to that effect is respectfully requested. Furthermore, the examiner is kindly invited to contact the Applicants' undersigned representative at the phone number below to resolve any outstanding issues.

Respectfully submitted,

OBLON, SPIVAK, McCLELLAND,
MAIER & NEUSTADT, L.L.P.

A handwritten signature in black ink, appearing to read 'James J. Kulbaski', is written over a horizontal line.

James J. Kulbaski
Attorney of Record
Registration No. 34,648

Customer Number
22850

Tel: (703) 413-3000
Fax: (703) 413 -2220
(OSMMN 08/09)

Sameer Gokhale
Registration No. 62,618